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Crystallization kinetics and the orientation of crystals under cylindrical nanoconfinement KYUNGHEE LEE, EUNTAEK WOO, KYONG WOOK NOH, School of Chem. and Bio. Eng., Seoul National University, YOUNG GYU JEONG, School of Adv. Mater. and Sys. Eng., Kumoh National Institute of Technology, JUNE HUH, School of Mater. Sci. and Eng., Seoul National University, KYUSOON SHIN* , School of Chem. and Bio. Eng., Seoul National University —
Crystallization kinetics, together with crystal orientation, is affected by the imposed geometric constraint. We investigated that crystallization of polymer and metal in nanopores with the variation of pore diameter. Crystallization of PE in nanopores is dominated by nucleation and the crystal growth is restricted by the limited space. On the basis of classical nucleation theory, we found that homogeneous nucleation dominates in larger pores while heterogeneous nucleation governs in smaller pores. We also investigated the orientation of crystal structures of polymer and metal in cylindrical nanopores, and found that the crystal orientation is influenced by crystallization mechanism. In nanoscopic cylindrical pores, the crystal growth is limited and the crystals are preferentially oriented along the pore axis.

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